Report into Structural Safety and Maintenance of Car Parks in the UK

July 2012
1.0 Introduction

This report has been prepared in response to a request from Parliamentary Under-Secretary of State for the Department of Transport Norman Baker for the BPA to provide evidence of defective car parks in the UK. Norman Baker addressed the BPA Council on this in December 2010.

The British Parking Association (BPA) undertook extensive research, using past reports including two by the Institution of Structural Engineers structural safety group CROSS (Confidential Reporting on Structural Safety), and through its own Structures and Asset Management Special Interest Group. Data was also obtained through a 2010 BPA survey looking into structural issues and an article on this subject was published in Parking News (see page 3).

The BPA recently submitted its formal response to the Portas Review in which it made clear that standards and quality should be driven up in car parks to provide a greater attraction for people to visit town centres.

Closing a car park has a significant impact on commercial businesses in the vicinity whilst also reducing revenue for the Local Authority. Car parks are therefore key assets that Local Authorities need to properly maintain and care for.

Unfortunately, evidence has shown that some Local Authorities and some private operations generally neglect car parks both from a structural and a decorative point of view. There are likely to be hundreds of examples nationwide of car parks which, if inspected by a qualified engineer, would need extensive repair. This is not to say they are all in immediate risk of collapse of course, and there are some excellent examples of well maintained and properly managed car parks. However, in the last two years five car parks have been reported as closed with structural fears, as listed in section 8.0. Some of these car parks have been demolished after intervention of the Health and Safety Executive and the BPA's concern is how close they actually came to collapse which could have resulted in catastrophic consequences. The BPA believe that good quality, well designed and properly maintained car parks can contribute significantly to the prosperity of Britain's towns and cities. The BPA works diligently towards this by sharing best practice, encouraging fair, reasonable and legitimate parking enforcement, and the promotion of safer parking through Park Mark®.

We want to see a greater emphasis on the need to ensure that parking structures are properly inspected and maintained. Owners and operators should be encouraged to have a financial mechanism in place to fund routine structural assessments, life-care planning and essential maintenance. Preparation and implementation of a life-car plan will identify defects and prompt repairs to minimise the risk of structural failure.

Although the Institution of Civil Engineers has published *Recommendations for Inspection, Maintenance and Management of Parking Structures* and there is legislation in place that requires owners and operators to maintain their car parks in a safe condition, it is not happening in practice. Research has shown that some car parks generate significant revenues but essential maintenance is being neglected as a result of diverting surplus income elsewhere.

Our sample of defective car parks compiled after a few months of research found the situation to be much worse than originally anticipated and appropriate action must be taken to ensure there is not a repeat of the 1997 Wolverhampton Pipers Row accident (Appendix 29). On that occasion, a potential catastrophe was avoided but there could have been a huge number of fatalities if the accident occurred at a busy period.

The following document provides the results of the research into car parks that have either been neglected or poorly maintained.
2.0 Research Findings

Results of the BPA Structures and Asset Management Special Interest Group (SAM-SIG) Survey
Completed by: Vince Ryan and Peter Guest - November 2011

During the initial meetings of SAM-SIG it was apparent that in order for the group to progress and develop a suitable strategy for the sector, additional information would be required. The first aspect of structural management to be assessed was the need and application levels of Life Care plans.

Therefore, in November 2009 SAM-SIG conducted a survey of BPA members in order to ascertain current levels of understanding and application of Life-care Plans. The results would be useful in order to plan the most appropriate actions required and in order to ensure the structural integrity of multi storey car parks throughout the UK as well as compliance with the Safer Parking Scheme.

The questionnaire was completed online and consisted of 21 closed questions. 90 responses were received and it is from those answers that this appraisal was completed.

Over half of respondents knew what a Life-Care Plan was (54%), especially those in the public sector (90% of those who declared an understanding). Only 13% declared no understanding of the scheme plus only 4% stated that they were not aware of the Park Mark scheme.

Another positive was the understanding of a requirement in law to ensure that the car park structures are safe, with 65% stating that they understood that there was a legal duty to inspect car parks, a similar percentage stating an understanding of Health and Safety at Work Act (1974) requirements and over half (53%) agreeing that car park structures should be inspected and certified safe in a similar format to bridges.

There would appear to be a relatively much higher awareness of the legal requirement to maintain regular inspections within the Public Sector and this also applies to the awareness of a Life-care plan and the implementation of a maintenance schedule, with less than 20% of those who confirmed that they have a life-care plan in place coming from the private sector.

The survey questionnaire did not request information regarding the age of car parks, split between public and private sectors or details of ownership. Within the private sector, therefore, it could be that the managers / operators believe that the responsibility for structural integrity remains with the landlord and / or the car parks operated may be new and still under a warranty.

Whereas 54% declared an understanding of a Life-care plan there appears to ambiguity as to what exactly constitutes a structural survey and also as to whether the Safer Parking Scheme covers structural integrity. This is highlighted in questions regarding frequency and type of inspections, where the answers indicate that respondents are probably aware of the existence of a Life-care Plan / inspection regime, but are maybe less sure as to what constitutes the same. There may also be some further confusion regarding the scope of items to be inspected (e.g. lighting, revenue systems etc).

52% of respondents stated that the inspections of the car parks were completed in-house. However, it is unclear from the survey as to whether these were completed by appropriately qualified personnel, with only 22% stating that they had definitely used a structural engineer contractor. The uncertainty relating to this
point was reinforced when just over a third of respondents declared knowledge of information that would help in this area, with nearly two thirds either not willing to answer or declaring a lack of knowledge.

Responses to the members’ insurance providers’ requirements were interesting in that whereas only 21% stated that their insurer requires an inspection, 7% said that they didn’t. This is an area that requires clarification. On a similar point Question 16 asked ‘Have You Had a Problem with Your Car Park Structure?’ to which at least 29% stated that they had previous structural problems, however 38% of respondents either didn’t answer or didn’t know.

Concerns were not raised by respondents regarding the costs of implementing Life-care plans, with the initial consensus that if funds were guaranteed Life-care plans would be introduced and primarily spent on the structure. It is not clear from the survey results that should additional funding be allocated for Life-care plans that this money, unless ring fenced, would purely be used for structural maintenance.

To summarise, the survey indicates that most car park managers are aware that there is a statutory duty to complete structural surveys and believe that it is good idea to do so. Most believe that funds would be available if a statutory system was in place and many are aware of the existence of Life-care plans. However, there does appear to be a problem transferring the requirement into appropriate action, confirmed by the fact that only 40% had a Life-care plan in place. The answers provided would indicate that this could be due to a lack of what is actually required and as to who should provide the service. Question 13b, where 78% provided ‘No Answer’ to the question ‘What stops you inspecting?’, perhaps provided the single most definitive confirmation that there appears to be a failure in the understanding / application of an inspection process, rather than a lack of resource or requirement.
3.0 Desktop Research

*Note: Some of these photos are old and remedial works may have since been undertaken. However, the images are good examples of the situations engineers are facing on a daily business.*

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### 4.0 Recently published articles from industry journals

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<td>CROSS newsletter - 2012 Confidential reporting on structural safety</td>
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5.0 Work by other professional bodies

The Institute of Structural Engineers Standing Committee on Structural Safety (SCOSS) published their tenth report, July 1992 to June 1994, expressing concerns about the maintenance of multi-storey car parks (MSCPs) and emphasized the need for planned structural appraisals by car park owners. This was followed by similar warnings in their 11th and 12th reports. However in 1996 a failure of a car park barrier in Watling Street MSCP in Canterbury resulted in a car and driver falling four storeys. This was followed by the partial collapse of Pipers Row MSCP in Wolverhampton in 1997 where the Health and Safety Executive (HSE) identified poor maintenance as the major contributory factor. SCOSS and HSE subsequently expressed concern about the risk of progressive collapse of some car park structures and recommended that inspection and maintenance should be regulated in a similar manner to bridges.

As there were over 4000 MSCP’s in the UK, representations were made to the then DETR to have these structures inspected on a mandatory basis but no legislation was put in place. However, in response the Institution of Civil Engineers set up a National Steering Committee and in 2002 published Recommendations for inspection maintenance and management of car park structures and in September 2002 the Office of the Deputy Prime Minister published Enhancing the whole life structural performance of Multi Storey Car Parks.

All these documents gave excellent guidance to practicing engineers but had little impact on those responsible for the funding. Since 2002 all the professional bodies have, through their technical journals, periodically raised concerns about the lack of maintenance of MSCPs blaming the current system as being self regulatory and not policed and therefore open to abuse.

6.0 Useful Links

http://www.lambeth.gov.uk/Services/TransportStreets/Parking/WhereToParkParkingCharges/DemolitionOf-BrixtonCarParkInPopesRoad.htm


http://www.theargus.co.uk/news/5032943.Weather_hit_Worthing_car_park_could_collapse/

http://www.thisislichfield.co.uk/news/Lichfield-car-park-shut-collapse-fears/article-1591689-detail/article.html

http://www.thisislichfield.co.uk/news/Lichfield-car-park-shut-collapse-fears/article-1591689-detail/article.html

http://www.building.co.uk/news/hse-report-allays-fears-over-car-park-collapse/3031317.article

http://news.bbc.co.uk/1/hi/8125308.stm
7.0 Documents referenced and attached

- Safe and Sound: A Guide to Life-care planning
- BPA Parking Practice Note 30 (PPN 30) Liability for Car Park Structures
- BPA Parking Practice Note 6 (PPN 6) Life-Care Plans for Parking Structures
- BPA Parking Practice Note 17 (PPN 17) Asset Management of Parking Structures

8.0 Recently closed multi-storey car parks

The following multi-storey car parks have been reported in the media as closed within the past two years through structural fears:

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<th>Location</th>
<th>Description</th>
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<tr>
<td>Crown Street, Ipswich</td>
<td>1000 space car park was closed and demolished</td>
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<tr>
<td>Queens Medical Centre, Nottingham</td>
<td>750 space car park closed after intervention by the HSE and demolished</td>
</tr>
<tr>
<td>Birmingham Road, Litchfield</td>
<td>479 space car park was in sudden risk of collapse and has been subject to major repairs</td>
</tr>
<tr>
<td>Central car park, Sunderland</td>
<td>391 space car park was closed within hours of a structural survey which deemed the car park to be unsafe</td>
</tr>
<tr>
<td>Carlton Street, Scunthorpe</td>
<td>550 (approximate) space car park similar to Pipers Row in Wolverhampton (British lift slab design) was closed and demolished</td>
</tr>
</tbody>
</table>
9.0 Conclusions and recommendations

This sample of defective car parks compiled after a few months of research found the situation to be much worse than originally anticipated.

As it was pointed out earlier, car parks generally are neglected both from a structural and a decorative point of view.

If nothing is done, there could be a repeat of the 1997 Wolverhampton Pipers Row accident (Appendix 29) and we might not be as lucky as in 1997 when a catastrophe was avoided, there could have been a huge number of fatalities if the accident occurred at a busy period.

We want to see a greater emphasis on the need to ensure that Britain’s parking structures are properly inspected and maintained. Proper servicing and maintenance should be seen as a priority cost of the operation and not a call on so-called ‘surplus’ funds generated at the car park.

The BPA is concerned that Britain’s many aging car parks are not properly serviced and maintained - too many are prematurely reaching the end of their useful life and being closed for safety reasons. Owners and operators should prepare and implement a life-care plan and undertake regular structural safety inspections which will identify defects and prompt repairs to minimise the risk of structural failure. Closure of multi-storey car parks has a detrimental effect on the community which the car park serves and works against the regeneration of town centres.
10.0 Disclaimer and confidentiality clauses

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Whilst the BPA and the author have made every effort to check facts and statements in this report, no liability can be accepted for negligence or otherwise in relation to the contents of the report. Much of the evidence in this report has been obtained from BPA members in confidence and therefore this report should be treated confidentially accordingly. The report is for the recipient only and no reliance should be placed on it by any third parties. Legislation and guidance are subject to change, and readers should seek appropriate up-to-date specialist advice relating to their circumstances.

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11.0 Appendix

Appendix 2
Appendix 3

Appendix 4 -
Note the aged asphalt creating route for water ingress and also trip hazards for public.
Appendix 5 -
Water ingress causing major corrosion to steel members

Appendix 6 -
Water ingress causing damage to a major concrete support member
Appendix 7 -
Lack of cover to steel in soffit

Appendix 8 -
Corrosion taking place
Appendix 9 -
Failed waterproofing leading to breakdown of the screed

Appendix 10 -
Failed roof waterproofing
Appendix 11 -
Failed anti-carbonation coatings

Appendix 12 -
Soffit spalling. Car park is owned by the council, part of which is closed off.
Appendix 13 -
Ruptured movement joints

Appendix 14 -
Many years of water ingress at a shear wall location
Appendix 15 -
Corroding beam

Appendix 16 -
Sign warning public of leaking water as an alternative to applying waterproofing
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Appendix 26 -
Deck cracks repaired with sealant yet still leaking
Appendix 26 continued

Appendix 27 -
The car park was closed because a large chunk of concrete spilled off the soffit of the 2nd level onto the traders below.

Appendix 28 -
Car park closes due to structural decline.
Reported in local newspaper
Appendix 29 -
Quantitative study of the causes of the partial collapse on 20th March 1997
Appendix 29 continued

Appendix 30 -

Appendix 31 and Appendix 32 can be found on the following pages